

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A method for in-situ modernization of a heterogeneous synthesis reactor, including an external shell comprising at least a catalytic bed ~~(6)~~loaded with a volume of catalyst and provided with a gas inlet perforated cylindrical wall ~~(7)~~ and a gas outlet perforated cylindrical wall ~~(8)~~, said method comprising ~~the steps of:~~

providing an unperforated cylindrical wall ~~(15)~~ coaxial to said gas outlet wall ~~(8)~~ in said catalytic bed ~~(6)~~, said unperforated cylindrical wall ~~(15)~~ extending from an upper end ~~(8a)~~ of said gas outlet wall ~~(8)~~ along a perforated portion of said gas outlet wall and for a predetermined length in said catalytic bed such that once the catalyst ~~(14)~~ is loaded within said catalytic bed ~~(6)~~ at least a portion of said unperforated cylindrical wall ~~(15)~~ remains below the upper level ~~(13)~~ reached by said catalyst ~~(14)~~, so as to define a free-space ~~(16)~~ between the perforated gas outlet wall ~~(8)~~ and the unperforated wall ~~(15)~~, for the passage of a part of the gas leaving said catalytic bed ~~(6)~~ through said portion of the gas outlet wall ~~(8)~~ facing said free-space ~~(16)~~, said free space ~~(16)~~ having a thickness great enough to allow said passage without causing an additional pressure drop;

providing a capping means ~~(17)~~ for closing an upper end of said free-space ~~(16)~~ between the unperforated wall ~~(15)~~ which extends below the upper level ~~(13)~~ reached by said catalyst ~~(14)~~ and the gas outlet wall ~~(8)~~, in proximity of the upper end ~~(8a)~~ of the wall ~~(8)~~, preventing thereby

a bypass of said catalytic bed or a recycling to the catalytic bed of the gas entering and leaving the reactor, respectively; and

loading the catalytic bed with a volume of catalyst smaller than said volume of catalyst.

2. (currently amended): The method according to claim 1, ~~wherein~~characterised in that said unperforated wall extends for a portion corresponding to 5%-50% of the length of said gas outlet wall ~~(8)~~.

3. (currently amended): The method according to claim 1, ~~wherein~~characterised in that said free-space ~~(16)~~ has a thickness between 0.5 and 10 cm.

4. (currently amended): The method according to claim 1, ~~wherein~~characterised in that said unperforated wall ~~(15)~~ is supported by said gas outlet wall ~~(8)~~.

5. (currently amended): The method according to claim 4, wherein said gas outlet wall ~~(8)~~ has a diameter smaller than the diameter of said gas inlet wall ~~(7)~~ and of said unperforated wall ~~(15)~~, ~~wherein~~characterised in that said unperforated wall ~~(15)~~ is supported by a gas-tight horizontal baffle ~~(17)~~ which protrudes above the upper end ~~(8a)~~ of said gas outlet wall ~~(8)~~, and rests on the same.

6. (currently amended): A heterogeneous synthesis reactor comprising:

an external shell (2);

at least a radial or axial-radial catalytic bed (6), provided with a gas inlet perforated cylindrical wall (7) and a gas outlet perforated cylindrical wall (8), extended in said shell (2); characterized in that it further comprises in said catalytic bed:

an unperforated cylindrical wall (15) coaxial to said gas outlet wall (8) in said catalytic bed (6), said unperforated cylindrical wall (15) extending from an upper end (8a) of said gas outlet wall (8) along a perforated portion of said gas outlet wall and for a predetermined length in said catalytic bed (6) such that once the catalyst (14) is loaded within said catalytic bed (6) at least a portion of said unperforated cylindrical wall (15) remains below the upper level (13) reached by said catalyst (14), so as to define a free-space (16) between the perforated gas outlet wall (8) and the unperforated wall (15), for the passage of a part of the gas leaving said catalytic bed (6) through said portion of the gas outlet wall (8) facing said free-space (16), said free space (16) having a thickness great enough to allow said passage without causing an additional pressure drop;

a cap (17) which closes said free-space (16) between the unperforated wall (15) and the gas outlet wall (8), in proximity of the upper end (8a) of the latter, preventing thereby a bypass of said catalytic bed or a recycling to the catalytic bed of the gas entering and leaving the reactor respectively,

wherein the catalytic bed is not closed at the top so as to allow for the passage of reaction gases.

7. (currently amended): The reactor according to claim 6, ~~wherein~~characterised in that said unperforated wall (15)-extends for a length corresponding to 5%-50% of the length of said gas outlet wall-(8).

8. (currently amended): The reactor according to claim 6, ~~wherein~~characterised in that said free-space (16)-is substantially annular and has a thickness between 0.5 and 10 cm.

9. (currently amended): The reactor according to claim 6, ~~wherein~~characterised in that said unperforated wall (15)-is supported by said gas outlet wall (8).

10. (currently amended): The reactor according to claim 9, wherein said gas outlet wall (8)-has a diameter smaller than the diameter of said gas inlet wall (7)-and of said unperforated wall (15), ~~wherein~~characterised in that said unperforated wall-(15) is supported by a gas-tight horizontal baffle (17)-which protrudes above the upper end-(8a) of said gas outlet wall-(8), and rests on the same.